

Amendment to the Claims

Claim 1 (Currently Amended)

An open wireless architecture (OWA) for fourth generation mobile communications said system comprising:

- a) a wireless communication terminal device supporting various different wireless ~~standards~~ (air interfaces) in the same device with same unique identifier and capable of communicating with other devices, systems or networks through a wireless medium ~~or over the air network~~,
- b) an advanced computer system equipped with full networking facilities to access various different backbone networks either through wireline networking interfaces or ~~sometimes~~ through broadband wireless access systems,
- c) an advanced transceiver system supporting various different air interfaces to interconnect said wireless communication terminal device, ~~etc~~ through the air link,
- d) said transceiver system connected to said computer system to construct the base-station as a whole,
- e) said wireless terminal device ~~can also~~ connected to different wireline networks through its networking interfaces in the said wireless terminal device,
- f) said base-station ~~can~~ connected to other base-station either over the wireline networks or over broadband wireless access system through said computer system, or by over-the-air networks through said transceiver system,
- g) said wireless terminal device ~~can also~~ connected to other wireless terminal device through the air link in an ad-hoc mode ~~in case of special situations~~.

Claim 2 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of claim 1 wherein: both said wireless terminal device and said base-station further comprising:

- a) an open processing engine ~~to~~ processing the signals and protocols of various different air-interfaces (~~including user-defined air interface~~) for over-the-air networking and transmission,
- b) a reconfigurable digital converter ~~to~~ transforming the received signals to the digital base-band signals and vice versa, and connected to said open processing engine,
- c) a programmable radio frequency (RF) module and smart antenna processing module of different frequencies ~~to~~ supporting different air-interfaces, and connected to said digital converter,
- d) a software definable module (SDM) containing parameters, algorithms and protocols; ~~etc~~ of some wireless air-interfaces to be stored in an external memory card or downloaded from networks,
- e) an open wireless BIOS (basic input/output system) structure capable of providing the common and open interfaces to said processing engine, said digital converter, said RF module and said SDM, ~~etc~~.

Claim 3 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of claim 1 wherein: both said wireless terminal device and said base-station further comprising:

- a) a system software module ~~to supporting~~ dynamic spectrum management, spectrum sharing and resource management to increase spectrum efficiency and optimize the system performance,
- b) a convergence layer module ~~to convergeing~~ wireline and wireless networks and services, as well as transmission convergence, ~~etc.~~,
- c) a configuration management module ~~to enableing~~ flexible system re-configuration when wireless air-interfaces changeing, wireline networking changesing or system settings changeing, ~~etc.~~

Claim 4 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device capable of system software running upon the system hardware directly while the application soft-ware executing on the real-time OS (~~operating system~~) standards through said open wireless BIOS.

Claim 5 (Currently Amended)

A system as recited in claim 2 wherein said open processing engine decodes, de-channelizes and demodulates the base-band channel signals and control signals of said various air-interfaces into detailed digital signaling, traffic and control information, ~~and vice versa.~~

Claim 6 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured and re-programmed as wireless router, mobile soft switch or wireless gateway, ~~etc.~~

Claim 7 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured to be ~~portable and/or mobile as well for military applications or special industrial applications. In that case,~~ that the said computer system connectsing to the backbone networks through said broadband wireless access systems instead of said wireline networking interfaces.

Claim 8 (Original)

A system as recited in claim 1 wherein said wireless terminal device and said base-station can communicate each other over said various different air interfaces including time-division multiple access (TDMA), code-division multiple access (CDMA), frequency-division multiple access (FDMA) or other user-defined interfaces.

Claim 9 (Original)

A method as recited in claim 8 detecting said various different air-interfaces for said wireless terminal device and said base-station, said method comprising:

- a) performing initial channel processing from the received signals, or
- b) scanning frequency carrier from the received signals, or
- c) performing different decoding scheme from the received signals, or
- d) performing different demodulation scheme from the received signals, or
- e) running user-defined detecting technologies.

Claim 10 (Currently Amended)

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A method as recited in claim 1 connecting said transceiver system and said computer system through open software structures, comprising:

- a) open operating systems supporting Windows, Linux or user-defined,
- b) open resource management covering spectrum, bandwidth, channels, capacity, processors, power, storage and services, etc,
- c) open communication application software enabling user-friendly programming and services,
- d) common objects library and functional components defining the converged processing elements,
- e) open configuration management supporting system reconfiguration in base-band parts, RF parts, antenna parts and networking parts, etc.

Claim 11 (Currently Amended)

A system as recited in claim 2 wherein said open wireless BIOS defining the basic interface structure for the said various different air-interfaces/~~wireless standards (either common standards or user-defined)~~, said ~~standards~~air-interfaces switching, said functional modules as well as switching between internal and/or external said modules, etc.

Claim 12 (Currently Amended)

A method as recited in claim 2 providing a smart antenna processing module for said OWA system, said method comprising:

- a) using antenna arrays to process radio signals in both space, not only and time, to improve performance in presence of wireless fading and interference,
- b) using beamforming algorithm to increase received signal-over-noise-rate (SNR) for desired directions,
- c) using diversity algorithm to combat fading in order to work at less SNR,
- d) using interference mitigation method to maximally reuse the channel frequencies,
- e) using spatial multiplexing algorithms to increase data speeds, for example, ~~MIMO~~ (multiple-in and multiple-out), etc (MIMO).

Claim 13 (Currently Amended)

A system as recited in claim 2 wherein said software definable module in said wireless terminal device can be stored in or installed from said external memory card (~~or SIM card~~), or downloaded from any available networking facilities of said wireless terminal device.

Claim 14 (Currently Amended)

A method as recited in claim 3 providing a convergence layer module for said OWA system, said method comprising:

- a) open service convergence including transparent integrated services across both wireline and wireless networks, etc,
- b) open transport convergence including ~~IP (internet protocol)~~ (IP) enterprise convergence and All-IP end-to-end convergence, etc,
- c) open transmission convergence including adaptive modulation, adaptive coding and adaptive equalization, etc.

Claims 15-20 (Canceled)